OIPE IAP97 MAR 31 2008 PATENT & TRADEMARK OFFICE

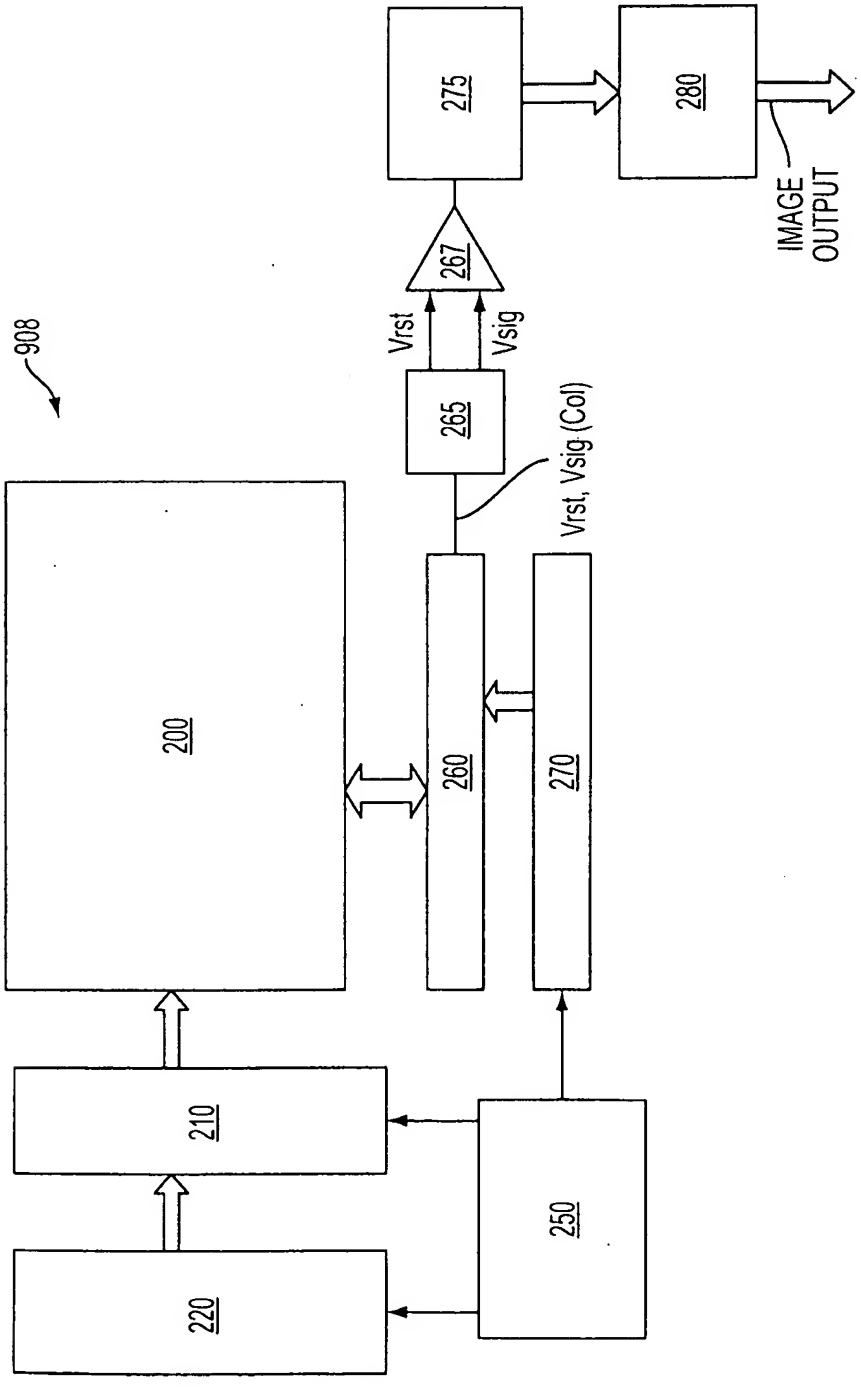

FIG. 1
PRIOR ART

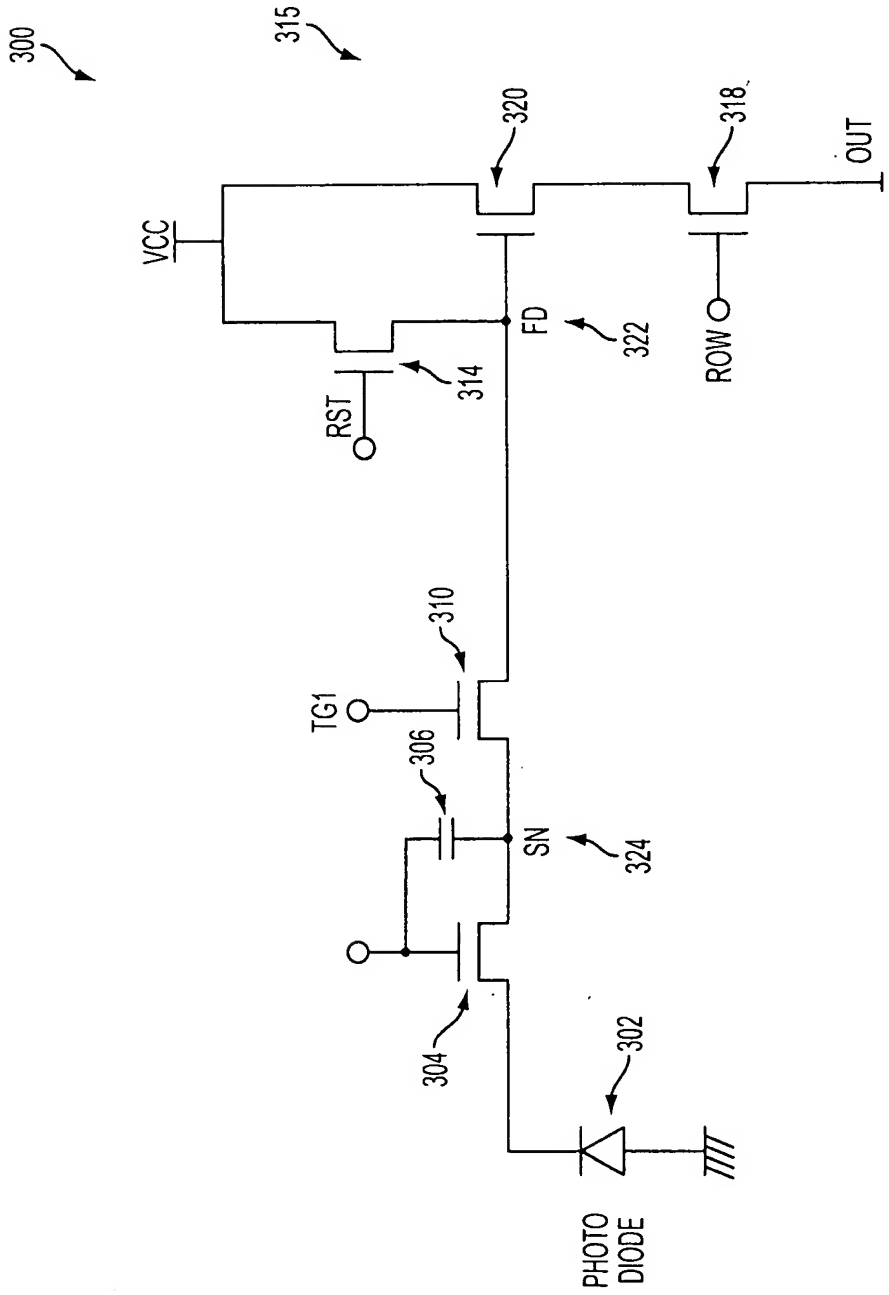
300
315
320
318
OUT
VCC
FD
322
ROW
RST
314
310
TG1
306
SN
324
304
302
PHOTO DIODE

FIG. 2

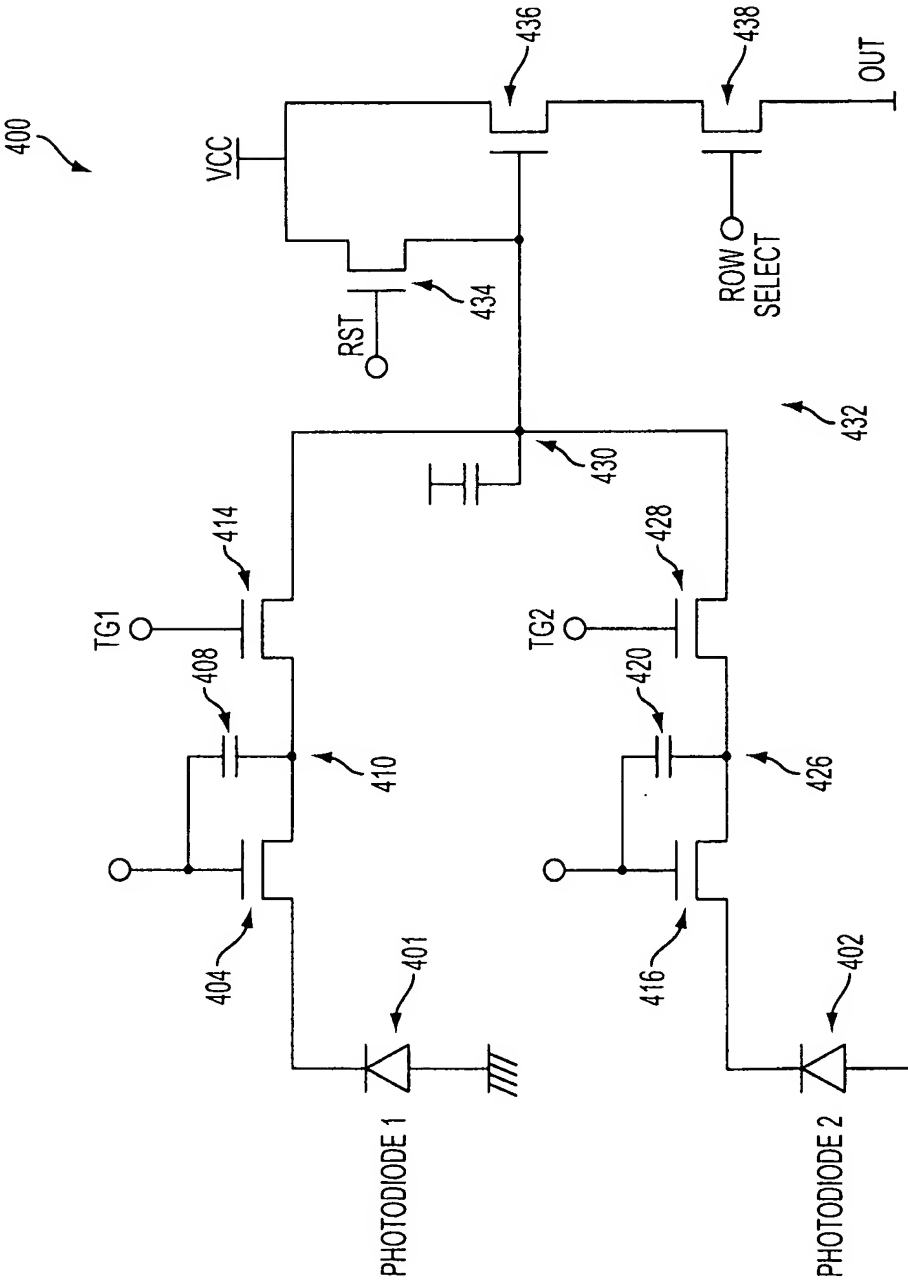
400
VCC
436
438
OUT
RST
434
ROW SELECT
432
430
414
428
TG1
TG2
408
420
410
426
404
416
401
402
PHOTODIODE 1
PHOTODIODE 2

FIG. 3

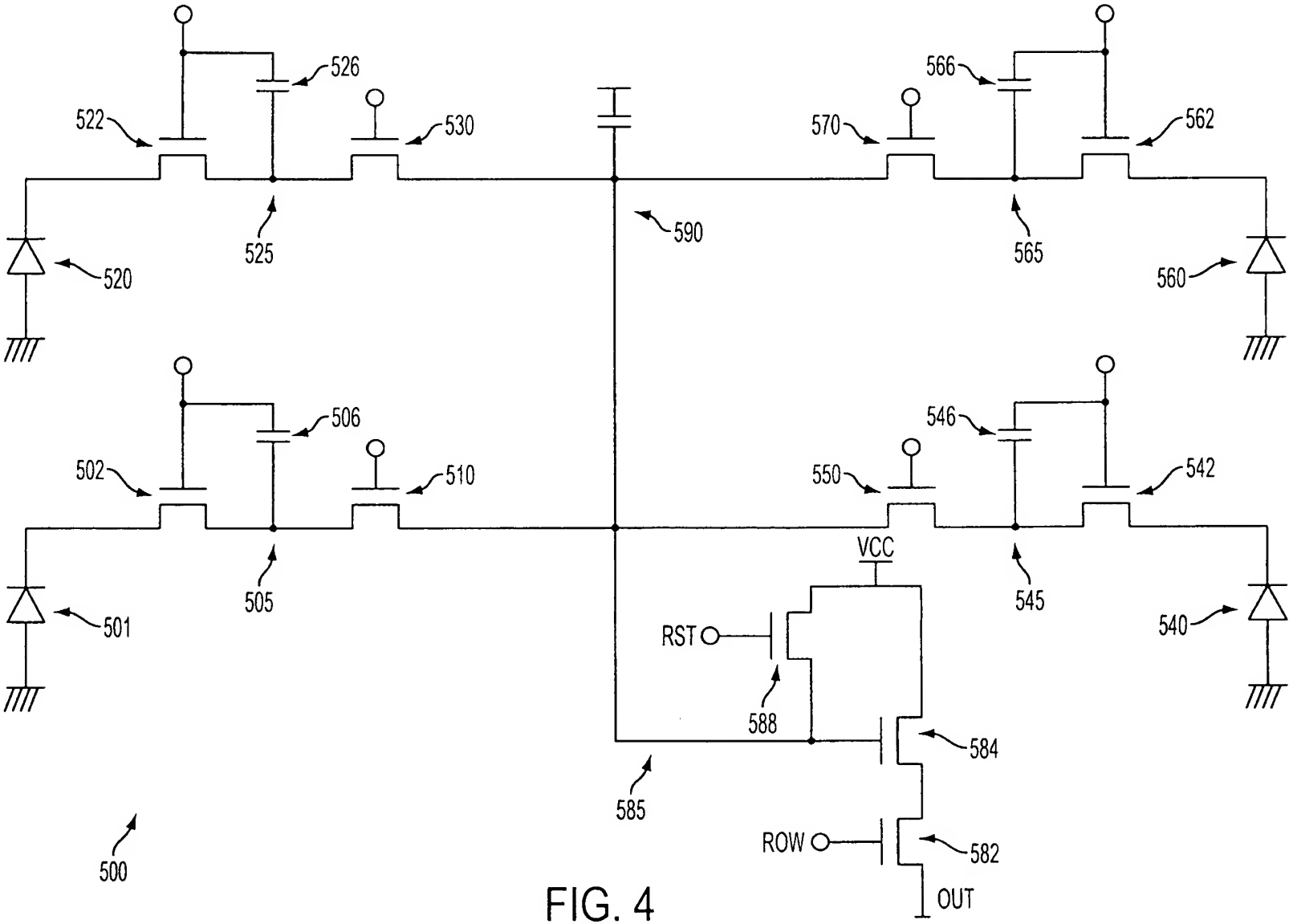
526
522
530
566
570
562
590
525
565
520
560
506
502
510
546
550
542
VCC
505
545
501
540
RST
588
584
585
ROW
582
OUT
500

FIG. 4

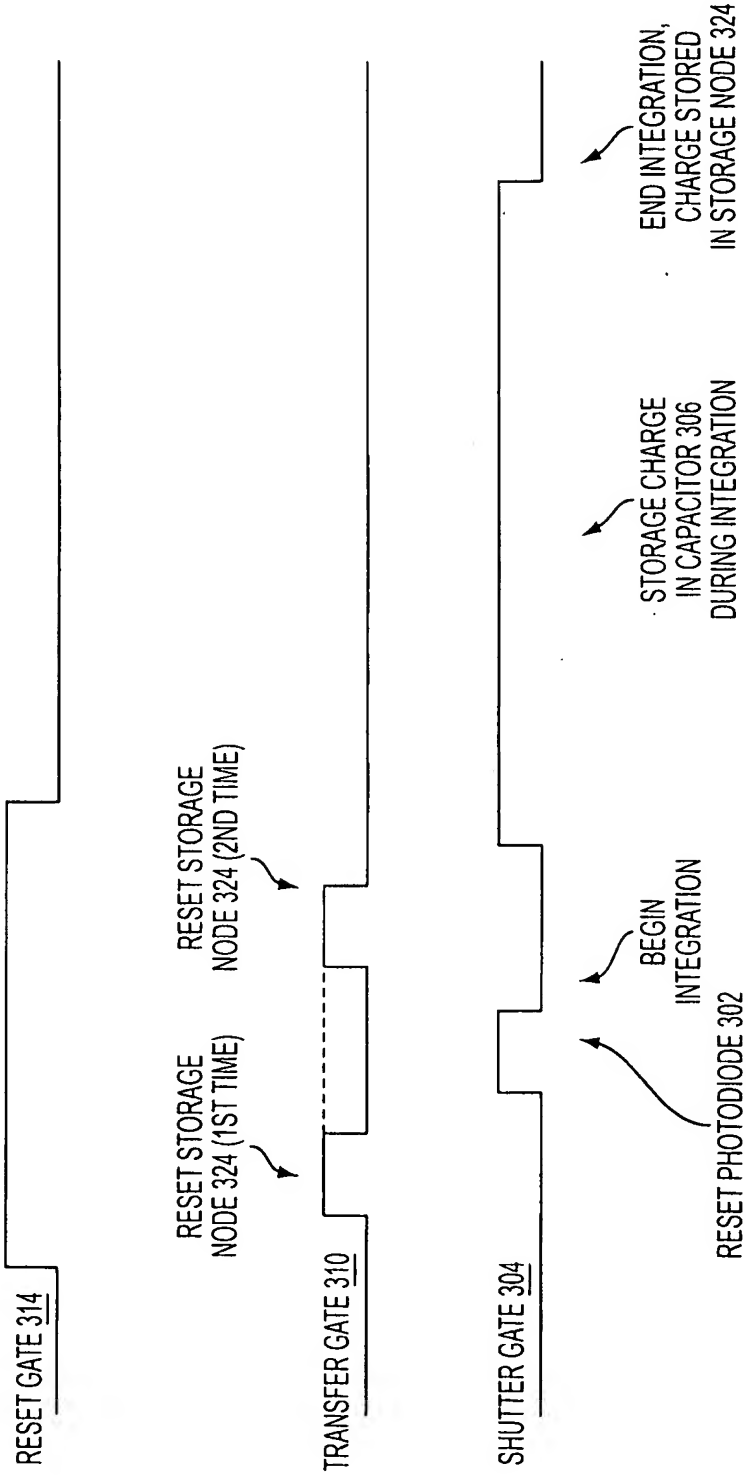
RESET GATE 314
RESET STORAGE NODE 324 (1ST TIME)
RESET STORAGE NODE 324 (2ND TIME)
TRANSFER GATE 310
SHUTTER GATE 304
RESET PHOTODIODE 302
BEGIN INTEGRATION
STORAGE CHARGE IN CAPACITOR 306 DURING INTEGRATION
END INTEGRATION, CHARGE STORED IN STORAGE NODE 324

FIG. 5

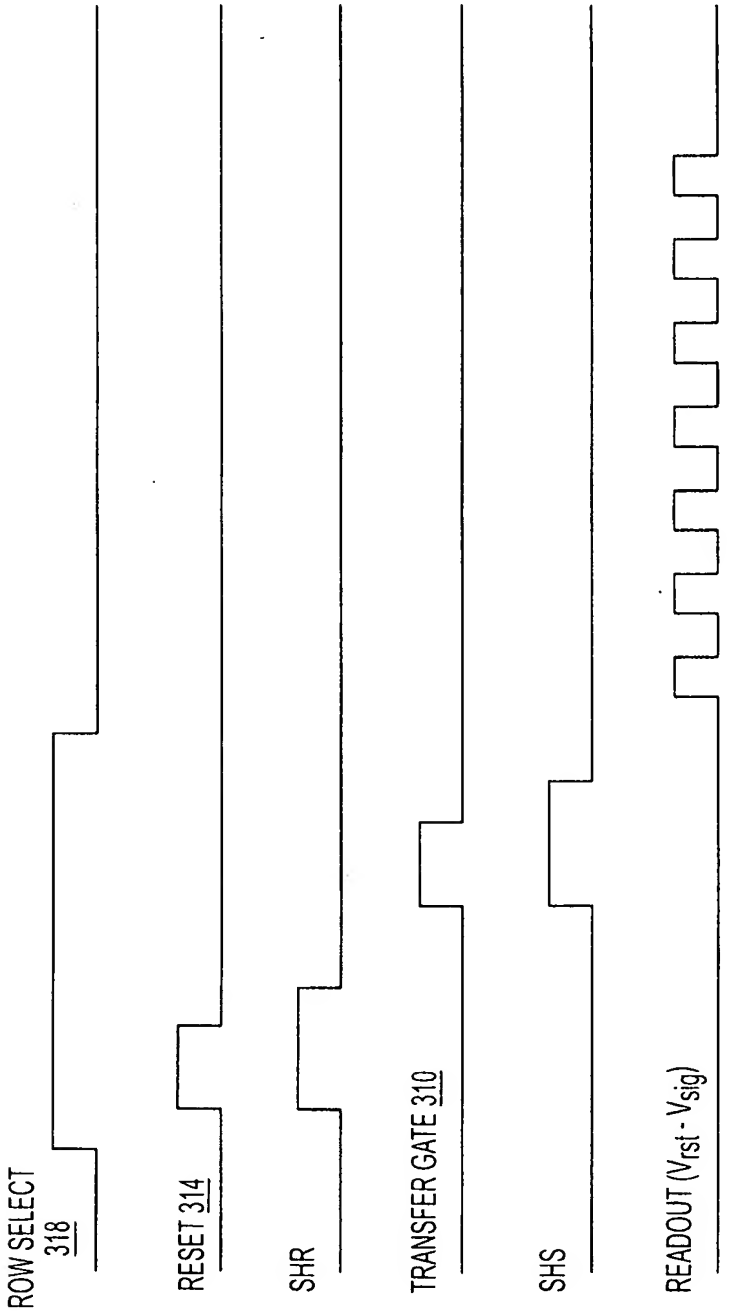
ROW SELECT 318
RESET 314
SHR
TRANSFER GATE 310
SHS
READOUT (V_{rst} - V_{sig})

FIG. 6

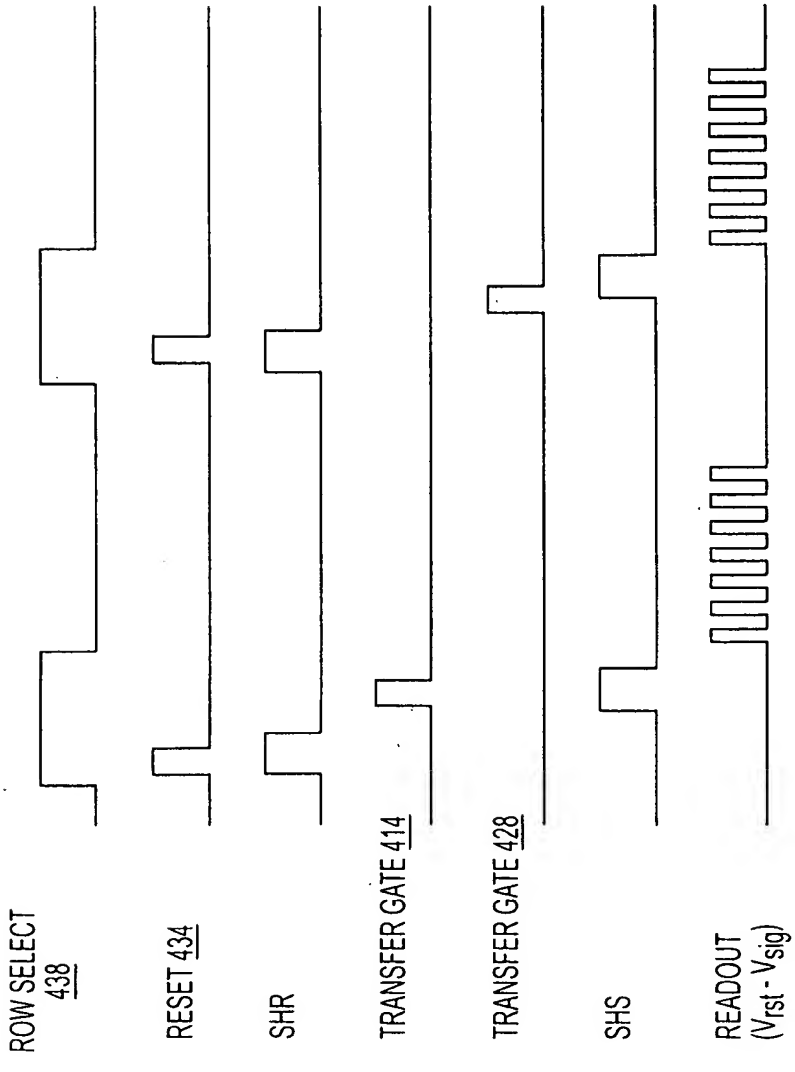
ROW SELECT 438
RESET 434
SHR
TRANSFER GATE 414
TRANSFER GATE 428
SHS
READOUT (V_{rst} - V_{sig})

FIG. 7

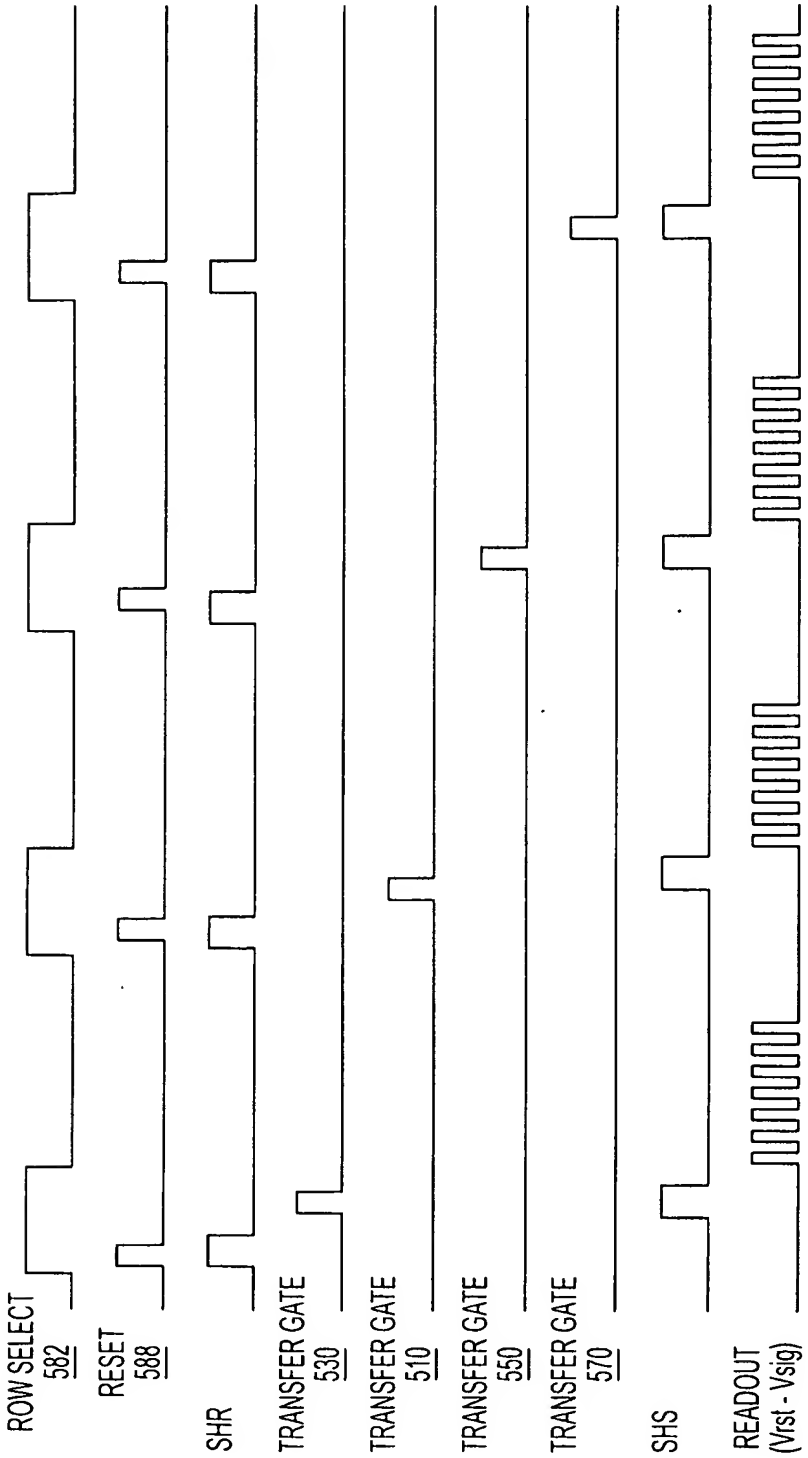
ROW SELECT
582
RESET
588
SHR
TRANSFER GATE
530
TRANSFER GATE
510
TRANSFER GATE
550
TRANSFER GATE
570
SHS
READOUT
(Vrst - Vsig)

FIG. 8

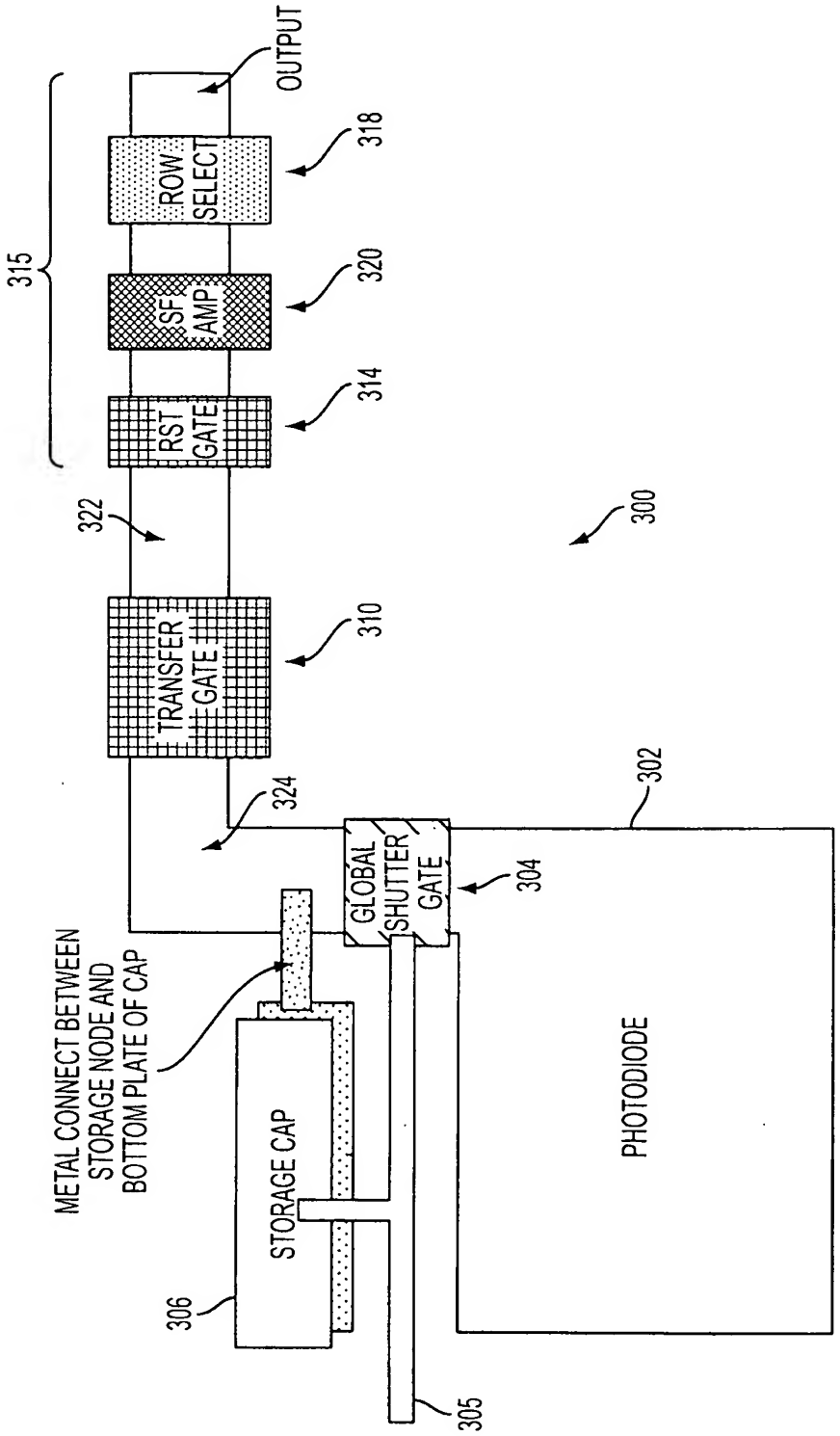
OUTPUT
318
ROW SELECT
315
320
SF AMP
314
RST GATE
322
300
310
TRANSFER GATE
302
324
GLOBAL SHUTTER GATE
304
METAL CONNECT BETWEEN STORAGE NODE AND BOTTOM PLATE OF CAP
PHOTODIODE
STORAGE CAP
306
305

FIG. 9

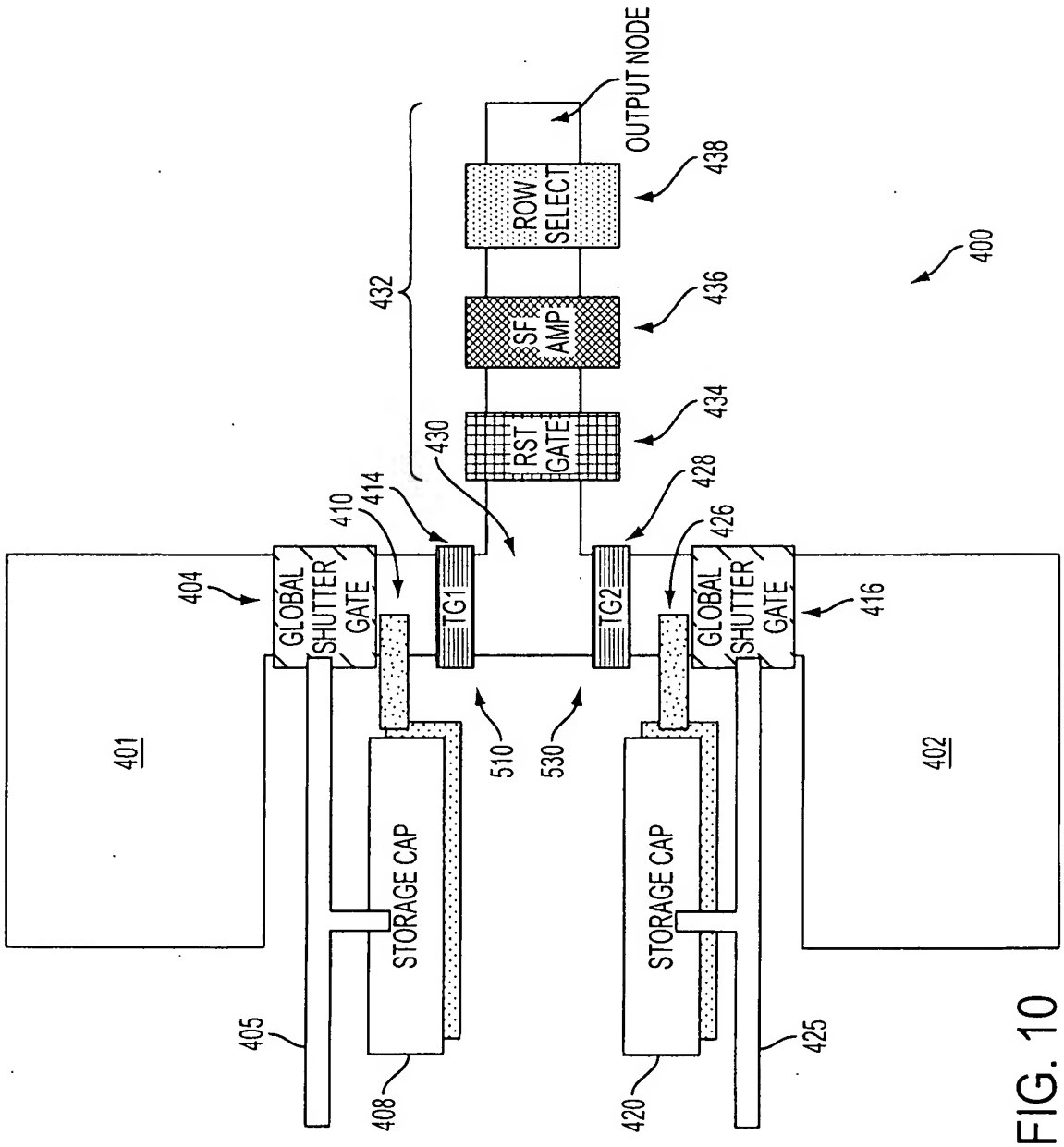
OUTPUT NODE
ROW SELECT
SF AMP
RST GATE
GLOBAL SHUTTER GATE
TG1
TG2
STORAGE CAP
401
402
400
404
405
408
410
414
416
420
425
426
428
430
432
434
436
438
510
530

FIG. 10

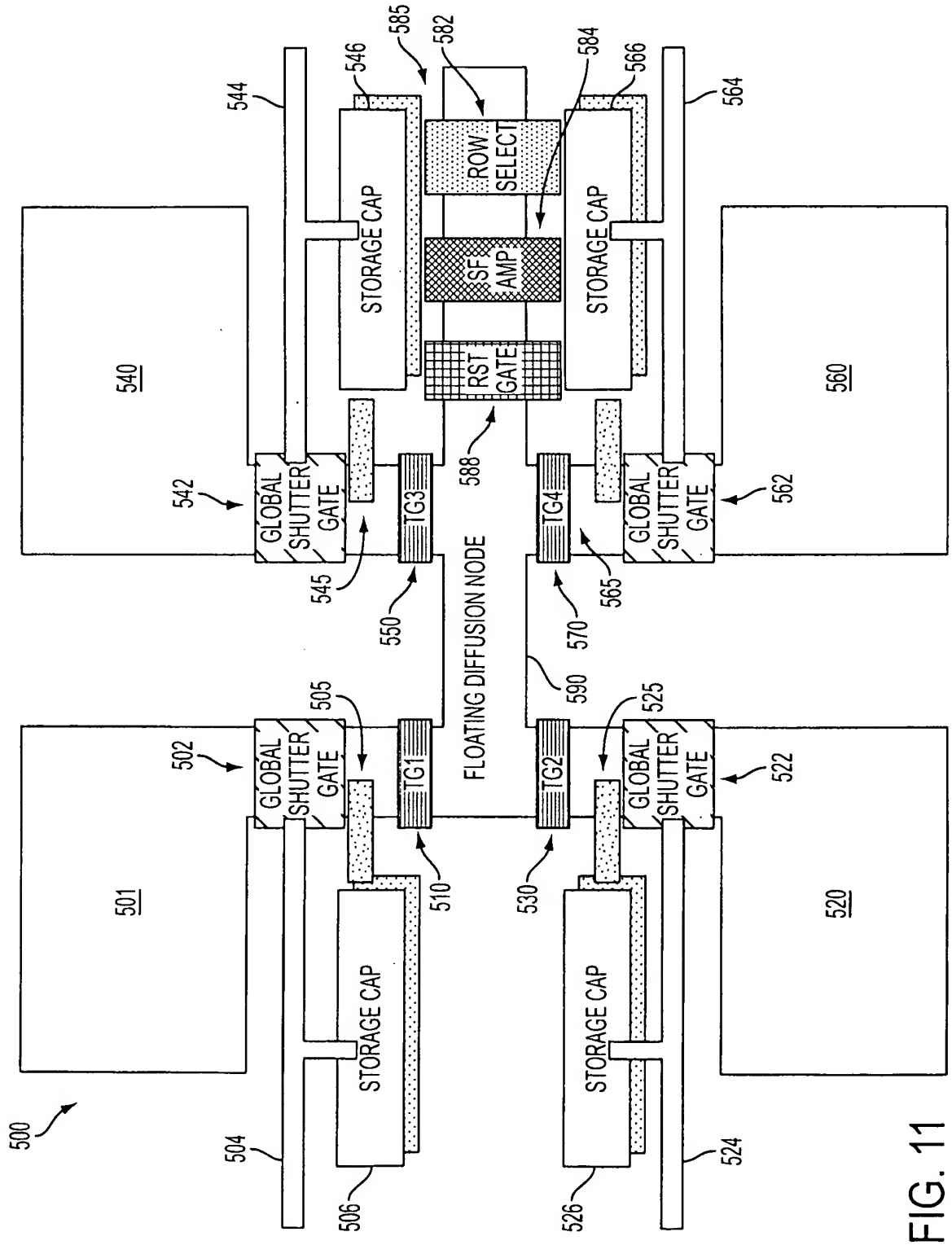
500
501
502
504
505
506
510
520
522
524
525
526
530
540
542
544
545
546
550
560
562
564
565
566
570
582
584
585
588
590
ROW SELECT
SF AMP
RST GATE
STORAGE CAP
GLOBAL SHUTTER GATE
TG1
TG2
TG3
TG4
FLOATING DIFFUSION NODE

FIG. 11

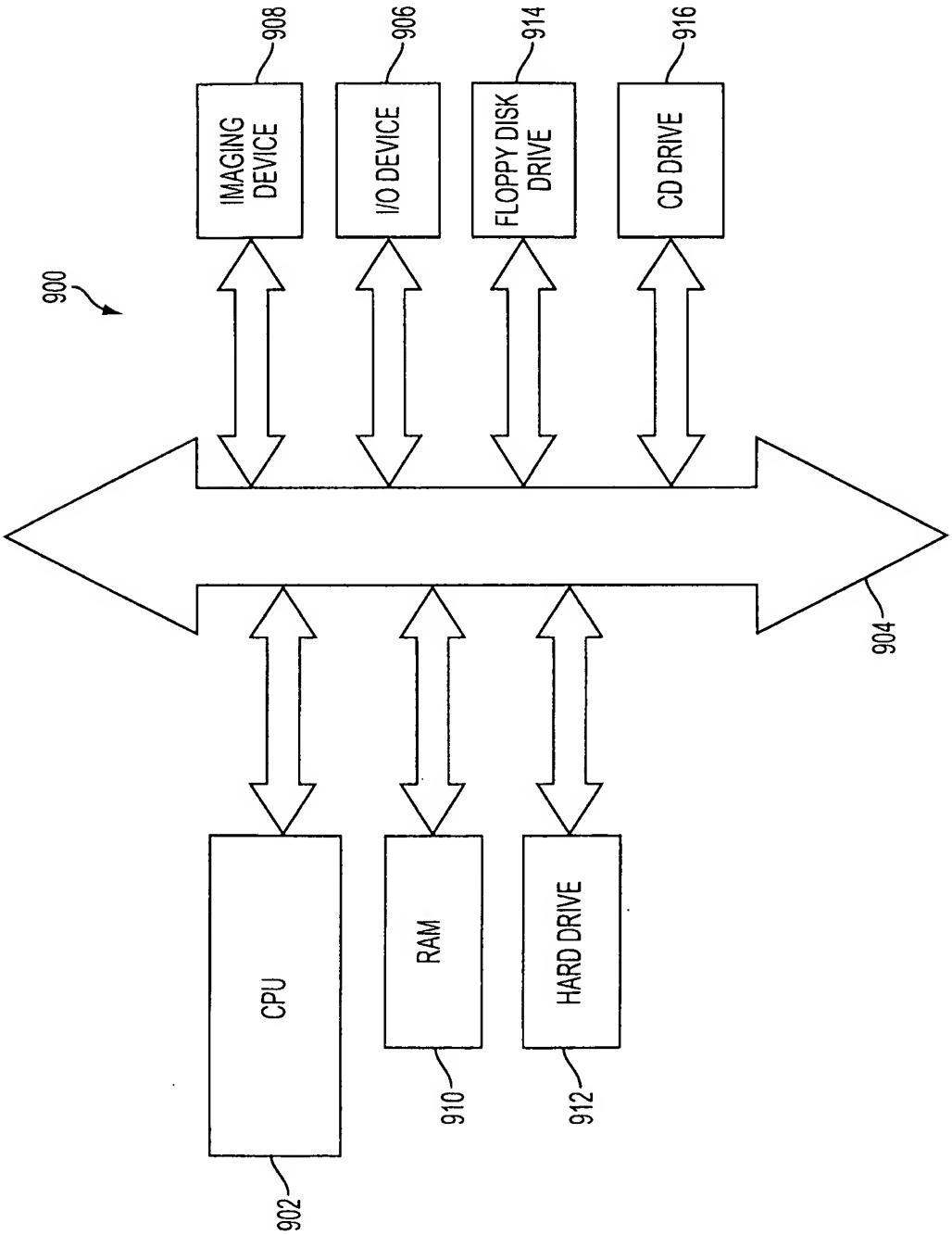
900
IMAGING DEVICE
908
I/O DEVICE
906
FLOPPY DISK DRIVE
914
CD DRIVE
916
904
CPU
902
RAM
910
HARD DRIVE
912

FIG. 12